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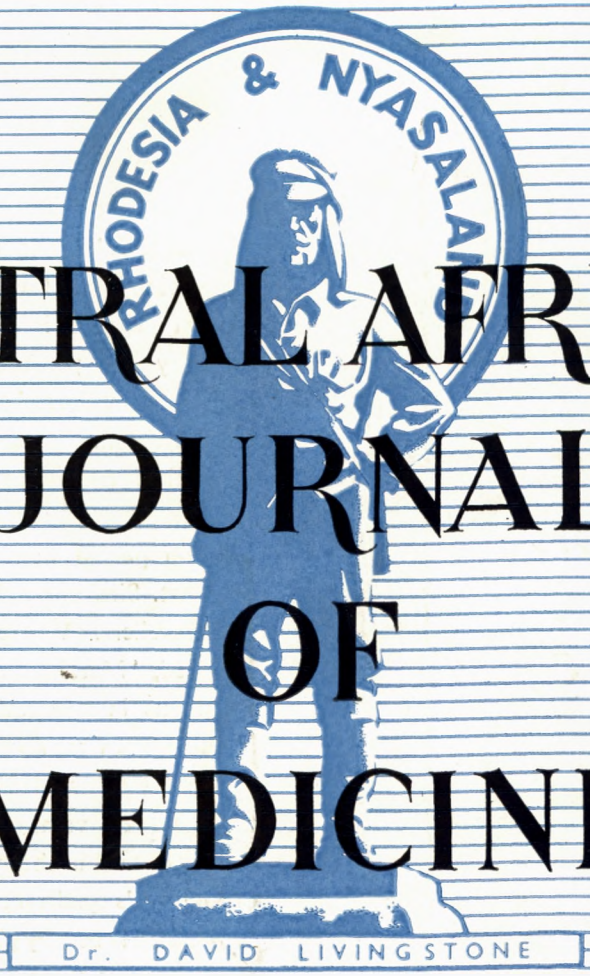

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CONTENTS

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A Brief Comparision of the Fertility and Mortality Rates of Africans in Various Countries

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The most frequently used measures of the fertility and mortality of a population are the crude birth and death rates and the infant mortality rate. These are normally based on (i) the number of births and deaths obtained from a comprehensive birth and death registration system; and (ii) census figures, or estimates based on censuses, of the total population. The reliability of the resulting crude birth and death and infant mortality rates depends on the completeness of the registration system and the accuracy of the basic population total.

The registration of African births and deaths has a fairly long history. It was started in Sierra Leone 155 years ago and has since spread to many other parts of Africa. However, in spite of generations of experience, no country has yet been able to produce reasonably reliable birth and death statistics of its African population without using sampling techniques. The figures that have been produced without sampling methods are often far too low to be acceptable and they often fluctuate erratically from year to year.

The fundamental reasons for this poor state of affairs are (i) the Africans' lack of interest in birth and death certificates and population counts; (ii) the illiterate nature of the population; and (iii) various customs and superstitions which interfere with population counts and the registration of births and deaths. The completeness of a birth and death registration system is a function of the public's need for birth and death certificates. There is a growing interest amongst Africans for birth certificates, but still little interest in death certificates. The illiterate nature of the population is a serious obstacle to be overcome in census taking. With a large illiterate population all the required information has to be obtained by verbal questioning, so that a vast army of enumerators is required. However, with a low standard of literacy amongst the population there are relatively few really suitable people available who can undertake the enumeration work.

The only way in which reasonably good birth and death rates are likely to be obtained within the next generation or two is by sampling. The main advantage of sampling is that the limited available resources can be concentrated on examining only a relatively small representative selection of the population. Apart from this a single enquiry can produce both vital statistics and population totals.

The demographic sample surveys carried out in Southern Rhodesia in 1948 and 1953 and in Northern Rhodesia in 1950 have been discussed by Shaul in preceding issues of this Journal. Similar methods were tried out in East Africa in 1948, but unfortunately in this case satisfactory birth and death statistics were not obtained.[5] However, taking all the available information into consideration, Martin [6] has estimated that

Table I.—Crude Birth and Death Rates Obtained by Sample Surveys

Country	*Date*	*Births per 1,000 Persons*	*Deaths per 1,000 Persons*	*Crude Rate of Natural Increase (per cent. per annum)*	*Infant Deaths per 1,000 Births*
Southern Rhodesia	1948*	45	19	2.6	123
	1953	42	13	2.9	120
Northern Rhodesia	1950	57	32	2.5	259
Belgian Congo	1952	33	22	1.1	148†
	1953	34	22	1.2	
French Guinea:					
Urban Areas	1954-55	53	27	2.6	160
Rural Areas		58	36	2.2	200

* In respect of area comparable with 1953 survey.

† In respect of 1950-52.

the crude rate of natural increase in Tanganyika and Uganda is about 1.5 per cent. per annum with a crude birth rate of between 40 and 45 and a crude death rate of 25 to 30. The Belgian Congo has produced some detailed figures by a form of sample check of birth and death registration areas.[14] Some further figures are available from a pilot survey carried out in French Guinea in 1954-55.[15] Sampling methods have also been tried out in Ruanda-Urundi [9] and in the Sudan,[21] but no results have yet come to hand for these areas. The available figures obtained from sampling enquiries are given in Table I.

The figures quoted in Table I indicate that the various parts of Africa have a wide range of birth, death and infant mortality rates. The birth rates vary from 33 per 1,000 persons in the Belgian Congo to 58 per 1,000 persons in French Guinea. The death rates per 1,000 persons range from 13 in Southern Rhodesia to 36 in French Guinea. The infant mortality rate is as high as 259 in Northern Rhodesia, but only 120 in Southern Rhodesia. The crude rate of natural increase varies from 1.1 per cent. per annum in the Belgian Congo to 2.9 per cent. per annum in Southern Rhodesia.

The accuracy of these figures has still to be confirmed by the results of subsequent surveys, and further results for these and other countries are awaited with much interest. Some of the variations noted above are no doubt due to errors in opposite directions. Shaul has pointed out [11] that the 1950 Northern Rhodesia figures probably overstate the true position, whereas the 1953 crude death rate in Southern Rhodesia is possibly understated. Another contributing factor is variations in the age distributions of the populations concerned. The infant mortality rate is unaffected by changes in the age distribution, but the crude birth rate and the crude death rate, particularly the latter, are affected by such changes. The effect of changes in the age distribution on the crude death rate may be illustrated by comparing the 1951 rate for Scotland with that for Africans in Southern Rhodesia in 1953. In both cases the rate is 13 per 1,000, suggesting that the Africans in Southern Rhodesia are just as healthy as the inhabitants of Scotland. However, if Scotland had the same age distribution as the Southern Rhodesia African population the crude death rate for Scotland would be only about 6 or 7 per 1,000. In general the age distributions of the African populations are similar to one another, but there appear to be some significant variations. For example, the proportion of the population under fifteen years of age ranges from about 35 per cent. in the Belgian Congo to approximately 46 per cent. in Southern Rhodesia. However, it seems unlikely that the errors in the reported number of births and deaths and variations in the age distributions are sufficiently large to account for more than a part of the marked variations reflected in Table I.

Further information regarding the fertility and mortality of the African populations may be obtained by examining the particulars regarding the average number of children ever born to the adult women and the number of these children still living. The relationships between (i) the average number of children ever born and the number of these still living on the one hand; and (ii) the fertility and mortality rates on the other hand, are rather involved ones. However, it has been shown [8] that—

(a) the total fertility rate may be estimated from the average number of children ever born to the living women aged fifteen years and over;

(b) the mean expectation of life at birth may be estimated from the proportion of these children still living at the date of a census or similar enquiry; and

(c) the total fertility rate and the mean expectation of life at birth can be brought together to obtain an estimate of the net reproduction rate.

The total fertility rate is a standardised measure of the birth rate. It may be visualised as the total number of children an average woman can expect to have if she lives to the age of fifty years. The mean expectation of life at birth is the average number of years a newly-born infant can expect to live. The net reproduction rate is a standardised measure of the net rate of population growth. It may be visualised as the rate of growth, per generation, that will eventually be achieved assuming the basic levels of fertility and mortality remain unchanged.

As measures of the basic level of fertility, mortality and population growth, the total fertility rate, the mean expectation of life at birth and the net reproduction rate are superior to crude birth and death rates and rates of natural increase because they are unaffected by the age composition of the population. They can be reduced to standardised birth and death

rates and a standardised annual rate of natural increase.[3] The standardised rate of natural increase is the compound rate of growth which is equivalent to the net reproduction rate. It is a function of both the net reproduction rate and the length of the generation to which the net reproduction rate refers. The corresponding standardised birth rate may be obtained by dividing the net reproduction rate by the mean expectation of life at birth. The standardised death rate is then simply the difference between the standardised birth rate and the standardised rate of natural increase.

The two basic requirements for estimating the total fertility rate, the mean expectation of life at birth and the net reproduction rate by the methods referred to above are (i) a knowledge of the age distribution of the women aged fifteen years and over; and (ii) a knowledge of the pattern of fertility over the childbearing ages. Neither of these two factors need be known very precisely. For the age distribution it is sufficient to know the number in three broad age groups, such as 0 to 14, 15 to 44 and 45 and over. In cases where even this is not known it is possible to use information in respect of a similar population. The pattern of fertility of African women appears to be very similar to that of the U.S.A. non-white population. Some comparative figures are given in Table II.

Table II.—Comparison of Pattern of Fertility of African and Non-African Populations

Population	*Date*	*Relative Age Specific Fertility Rates of Women in the Following Age Groups**						
		Under 20	20-24	25-29	30-34	35-39	40-44	45-49
Northern Rhodesia Copperbelt [7]	1951	.043	.047	.037	.027	.021	.008	.017
East African Medical Survey [1]	1952	.067	.053	.036	.022	.015	.006	.001
Belgian Congo [14]	1953	.026	.050	.048	.034	.026	.015	.001
French Guinea: [15]								
Urban Areas	1954-55	.041	.049	.047	.032	.018	.013	
Rural Areas	1954-55	.040	.045	.044	.035	.028	.008	
U.S.A. non-Whites	1940	.045	.059	.041	.029	.018	.007	.001
Average of 30 non-African countries†		.012	.048	.054	.044	.028	.012	.002

* The proportion of the total children, borne by an average woman living to the age of fifty years, which is borne in any one year in the specified age group.

† Average of the figures given in the 1942-44 *Statistical Yearbook* of the League of Nations.

In the absence of any further evidence on the subject it is here assumed that the African women have the same pattern of fertility as the U.S.A. non-White population. Relatively, though not necessarily absolutely, African women have fewer children after the age of 25 years and more children before the age of 25 years than the non-African populations, other than non-Whites in the U.S.A., for which figures are available. The mean age at which African women have children is about 26 years as against about 29 years in the case of non-African women. This means that the length of an African generation is approximately 26 years as against an average of 29 years in the case of non-African populations.

Table III.—Estimates of Fertility and Mortality Rates of Various African Populations Obtained From Information Regarding the Total Number of Children Ever Born and the Number of These Still Living

Population	*Date of Enquiry*	*Total Fertility Rate*	*Mean Expectation of Life at Birth*	*Net Reproduction Rate*	*Standardised Birth Rate*	*Standardised Death Rate*	*Standardised Annual Rate of Natural Increase*
Angola	1940	3.6	35	1.0	29	29	0.0
Gold Coast	1948	5.1	38	1.5	39	23	1.6
Lagos Municipality	1950	2.6	46	0.9	20	24	-0.4
Mozambique	1940	3.5	45	1.1	24	20	0.4
Rhodesia:							
Northern	1950	5.9	37	1.7	46	25	2.1
Southern	1953	5.7	48	2.0	42	13	2.9
Swaziland	1946	4.5	48	1.6	33	14	1.8

Some estimates of the total fertility rate, the mean expectation of life at birth, the net reproduction rate, standardised birth and death rates and the standardised rate of natural increase obtained by the methods referred to above are given in Table III. It should be noted that standardised birth and death rates and standardised rates of natural increase are not comparable with corresponding crude rates. Crude rates are influenced by the present-day age structure of the population as well as by the basic level of fertility and mortality, whereas the standardised rates are independent of the present age structure. Any given basic level of fertility and mortality will generally lead to gradual changes in the age structure of the population, and these changes will be reflected in the crude rates. These changes will continue for a period of two or three generations until the age structure has stabilised itself to the given basic levels of fertility and mortality. The standardised rates are those that would eventually occur when the age structure has become stable. The fact that in the case of Southern Rhodesia the crude rates given in Table I are the same as the standardised rates given in Table III is therefore merely a coincidence.

In examining the figures given in Table III it should be borne in mind that they are affected by various reporting errors. The two basic figures on which these estimates are based are (i) the total number of children ever born to the women alive at the dates of the enquiries; and (ii) the number of these children still living at the date of the investigations. The reporting errors in these two figures may be divided into two groups, namely, those affecting the children who have died and those affecting the children still living. The reported number of children ever born is affected by errors in both the number of children who have died and the number of children still living.

The number of children who have died is to some extent understated. Infanticidal deaths and ritual murders are not likely to be reported. Children that die in early infancy are likely to be classed as miscarriages and therefore omitted. There is also sometimes a reluctance to talk about the dead because of a fear that this will annoy the spirit of the dead person. The number of children still living may be either over-stated or under-stated. If care is not exercised in questioning the women the latter may inflate the figure by reporting "adopted" children as their own. (The term "adopted" here includes the husband's children by a previous wife who has died.) On the other hand, there are sometimes taboos which lead to the omission of one of the children. For example, the first born is sometimes not included by its mother because it is unlucky for her to do so, though the father or some other relative may be free to refer to this child.

Errors in the reported number of children who have died have, fortunately, no significant affect on the net reproduction rate and the standardised rate of natural increase. In fact, these two figures may be obtained directly from the information regarding only the living children. The omission of some of the children who have died leads to an over-estimate of the mean expectation of life at birth and an under-estimate of the standardised death rate. However, this is completely offset by a corresponding under-estimate of the total fertility rate and the standardised birth rate. Errors in the reported number of children still living are more serious, as they affect all the estimates. An over-statement of the average number of children still living raises the total fertility rate, the mean expectation of life at birth and the net reproduction rate, while an under-statement of the number of children still living reduces all these figures.

Although it must be accepted that the estimates given in Table III are subject to various sources of error, it is difficult to believe that these errors alone account for the marked variations in the figures. There is a strong indication that there are marked variations in the basic levels of fertility and mortality in African countries. It appears that the standardised birth rate ranges from 20 in the Lagos municipality to 46 in Northern Rhodesia, and that the standardised death rate ranges from 13 in Southern Rhodesia to 29 in Angola. The standardised rate of natural increase, which is not affected by reporting errors in the number of children who have died, appears to range from a negative figure of 0.4 per cent. per annum in the Lagos municipality to the very high level of 2.9 per cent. per annum in Southern Rhodesia.

Some further information regarding the fertility and mortality of African populations which is of general interest is given by Mitchell,[7] Sadie[10] and the Belgian[14] and French authorities.[15] In 1953 Mitchell estimated that the total fertility rate of Africans on the Northern Rhodesia Copperbelt was 4.3. This is very close to the total fertility rate of 4.2 for the Belgian Congo in 1953. However, the authorities in

French Guinea have estimated that the total fertility rate is 4.9 in urban areas and 7.0 in rural areas. In the Belgian Congo the mean expectation of life in 1950-52 was about 39 years. This is a little higher than Sadie's average of 36 years for the Africans on the Witwatersrand in 1946.

Some of the factors which might account for the marked variations in the levels of fertility and mortality of African populations are differences in marriage customs, differences in the proportion of adult males away from home and working in European areas or neighbouring territories, and also variations in the incidence of diseases. Preliminary investigations have indicated that polygamy is associated with a low level of fertility, but that fertility is unaffected by variations in the proportion of the adult males away from home. Variations in mortality rates are not surprising when it is borne in mind that there are probably marked territorial variations in the incidence of various diseases and also in the extent of public health services. It is to be expected that variations in the incidence of certain diseases, for example, venereal diseases, have also a marked effect on basic levels of fertility.

REFERENCES

1. Brass, W. (1953). "Derivation of Fertility and Reproduction Rates," *Population Studies*, Vol. VII, No. 2.
2. ——— (1954). "The Estimation of Fertility Rates from Ratios of Total to First Births," *Population Studies*, Vol. VIII, No. 1.
3. Dublin, L. I. & Lotka, A. J. (1925). "On the True Rate of Natural Increase," *Journal American Statistical Association*, Vol. XX.
4. Kuczynski, R. R. *A Demographic Survey of the British Colonial Empire;* Oxford University Press, Vols. I and II.
5. Martin, C. J. (1950). "East African Population Statistics," *Journal Royal Statistical Society*, Series A, Vol. CXIII, Part III.
6. ——— (1953). "Some Estimates of the General Age Distribution, Fertility and Rate of Natural Increase of the African Population of British East Africa," *Population Studies*, Vol. VII, No. 2.
7. Mitchell, J. C. (1953). "An Estimate of Fertility Among Africans on the Copperbelt of Northern Rhodesia," *Rhodes-Livingstone Journal*, No. 13.
8. Myburgh, C. A. L. (1954). "A Method of Estimating the Net Reproduction Rate from Returns of the Total Number of Children Ever Born and the Number of these Still Living"; a paper submitted to the 1954 World Population Conference.
9. Neesen, V. (1952). "Un Nouvel Echantillon de la Population du Ruanda-Urundi," *Bulletin Mensuel des Statistiques du Congo Belge*, Vol. 3, No. 21.
10. Sadie, J. L. (1951). "Differential Mortality in South Africa," *South African Journal of Economics*, Vol. 19, No. 4.
11. Shaul, J. R. H. (1955). "Preliminary Results of the Second Demographic Survey of the African Population of Southern Rhodesia," "Results of the Demographic Sample Survey of the African Population of Northern Rhodesia." *Central African Journal of Medicine*, September and November, 1955.
12. *Censo Geral de Populacao*, 1940. Imprensa Nacional, Luanda, Vols. III, XI and XII.
13. "Tables de Mortalite de la Population Congolaise," *Bulletin Mensuel des Statistiques du Congo Belge*, Vol. 4, No. 38.
14. *La Population Congolaise en* 1953, Secretariat General, Leopoldville.
15. *L'Enquete Demographique de Guinee*, 1954-55, Ministere de la France D'outre-mer-service de Statistique.
16. *Census of Population*, 1948 (Gold Coast), Crown Agents.
17. *Censo da Populacao em* 1940, Imprensa Nacional, Lourenco Marques, Vols. II, III and V.
18. 1950 *Population Census of Lagos*, Government Printer, Kaduna.
19. 1950 *Demographic Sample Survey of the African Population of Northern Rhodesia*, Central African Statistical Office, Salisbury.
20. *Preliminary Report on the Second Demographic Sample Survey of Southern Rhodesia*, Central African Statistical Office, Salisbury.
21. *Proposed Methods for the Census*, Department of Statistics, Khartoum.
22. *Swaziland Census*, 1946, Swaziland Government, Mbabane.